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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/401,132	09/22/1999	HUNG-JU LEE	SAR-12598A	4242

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THE LAW OFFICES OF ANDREW D. FORTNEY, PH.D., P.C.
401 W FALLBROOK AVE STE 204
FRESNO, CA 93711-5835

EXAMINER	
WONG, ALLEN C	
ART UNIT	**PAPER NUMBER**
2621	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/401,132	LEE ET AL.	
	Examiner	**Art Unit**	
	Allen Wong	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-30 and 32-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-30 and 32-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/2/06 have been fully read and considered but they are not persuasive.

Regarding the last line on page 8 of applicant's remarks, applicant states that Klein Gunnewiek does not meet the deficiency of Eleftheriadis. The examiner respectfully disagrees. The test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal, as disclosed in Gunnewiek's column 2, lines 37-38.

Regarding the first paragraph on page 9 of applicant's, applicant states that a terminal disclaimer will be filed to overcome the non-statutory double patenting rejection

of claims 22-24, 27-30, 32-34, and 37-38 in the future. As of now, the double patenting rejection will be maintained.

Regarding lines 1-4 on page 10 of applicant's remarks, applicant asserts that Eleftheriadis does not disclose "recursively adjusting the target frame bit rate for each frame in the sequence", as disclosed in claims 22 and 32. The examiner respectfully disagrees. In column 8, lines 17-39, Eleftheriadis discloses the recursive buffer rate control scheme is utilized to ensure that the buffer does not overflow or underflow, where the quantization parameter can be recursively adjusted for adjusting the frame bit rate for each frame in a group of frames that including I, P and B frames. Thus, Eleftheriadis discloses the limitation "recursively adjusting the target frame bit rate for each frame in the sequence".

Regarding lines 5-7 on page 10 of applicant's remarks, applicant states that Eleftheriadis fails to disclose allocating a target frame bit rate among a plurality of objects in accordance with the formula $V_i = K_i \times T_{frame}$ where V_i is a target object bit rate for each object, and K_i is proportional to an average pixel value for the object. The examiner is not relying solely on Eleftheriadis, but on the combination of Eleftheriadis and Klein Gunnewiek. In column 11, line 65 to column 12, line 19, Eleftheriadis discloses that equation 4 is used to determine the target frame bit rate, where part of the target frame bit rate is allocated as the target object bit rate, while the remainder is allocated as background target bit rate, the sum of the two being equal to the target frame bit rate R. Thus, Eleftheriadis discloses the allocation of said target frame bit rate

among the plurality of one object in accordance with a target object bit rate for the at least one object.

Eleftheriadis does not specifically disclose the equation $V_i = K_i \times T_{frame}$. However, in Klein Gunnewiek's equations 4 and 5, there are values T_p and T_B and T_I that signify the target frame bit rates, and that K_p and K_B are constant values that are applied in a similar manner to applicant's K_i in the applicant equation $V_i = K_i \times T_{frame}$ where T_{frame} can be derived to be equal to $T_{frame} = V_i / K_i$. Thus, conceptually, Klein Gunnewiek teaches that the derivation of the target frame rates of I, P and B frames can be ascertained mathematically from the equations for different targeted frames and pictures. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal, as disclosed in Gunnewiek's column 2, lines 37-38.

Regarding lines 25-27 on page 10 of applicant's remarks, applicant states that Eleftheriadis does not disclose allocation of a target frame bit rate. The examiner respectfully disagrees. See the above paragraphs and in the rejection below for explanation.

Regarding lines 4-6 on page 11 of applicant's remarks, applicant states that Eleftheriadis does not disclose determining a target bit rate based on average pixel

value for the object. Again, see the above remarks and in the rejection below for explanation.

Regarding lines 14-18, 22-24 on page 11, and lines 20-21 on page 12 of applicant's remarks, applicant argues that Eleftheriadis discloses the target object bit rates are not allocated in accordance with a target frame rate. The examiner respectfully disagrees. In column 11, line 65 to column 12, line 19, Eleftheriadis discloses that equation 4 is used to determine the target frame bit rate, where part of the target frame bit rate is allocated as the target object bit rate, while the remainder is allocated as background target bit rate, the sum of the two being equal to the target frame bit rate R. Thus, Eleftheriadis discloses the allocation of said target frame bit rate among the plurality of one object in accordance with a target object bit rate for the at least one object.

Regarding lines 1-6 and lines 21-22 on page 12 of applicant's remarks, applicant states that Eleftheriadis does not disclose "recursively adjusting a target frame rate", as disclosed in claims 22 and 32. The examiner respectfully disagrees. In column 8, lines 17-39, Eleftheriadis discloses the recursive buffer rate control scheme is utilized to ensure that the buffer does not overflow or underflow, where the quantization parameter can be recursively adjusted for adjusting the frame bit rate for each frame in a group of frames that including I, P and B frames. Thus, Eleftheriadis discloses the limitation "recursively adjusting a target frame rate".

Regarding lines 25-27 on page 12 of applicant's remarks, applicant contends that Eleftheriadis fails to disclose a controller of claim 29, that determines the target object

bit rate from a target frame bit rate in accordance with an average pixel value for each of the objects. In figure 16, Eleftheriadis discloses the recursive "rate control" scheme is done, and that a quantization rate controller is applied to control the buffer overflow and underflow conditions for controlling the buffer occupancy. Also, in column 8, lines 17-39, Eleftheriadis discloses the recursive buffer rate control scheme is utilized to ensure that the buffer does not overflow or underflow, where the quantization parameter can be recursively adjusted for adjusting the frame bit rate for each frame in a group of frames that including I, P and B frames.

Eleftheriadis does not specifically disclose determines the target object bit rate from a target frame bit rate in accordance with an average pixel value for each of the objects. However, in Klein Gunnewiek's equations 4 and 5, there are values T_p and T_B and T_I that signify the target frame bit rates, and that K_p and K_B are constant values that are applied in a similar manner to applicant's K_i in the applicant equation $V_i = K_i \times T_{frame}$ where T_{frame} can be derived to be equal to $T_{frame} = V_i / K_i$. Thus, conceptually, Klein Gunnewiek teaches that the derivation of the target frame rates of I, P and B frames can be ascertained mathematically from the equations for different targeted frames and pictures. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal, as disclosed in Gunnewiek's column 2, lines 37-38.

Regarding lines 4-6 on page 13 of applicant's remarks, applicant states that Eleftheriadis does not appear to disclose any connection between the bandwidth of the channel which is accepting data from the buffer and a target frame bit rate. The examiner respectfully disagrees. In figure 16, Eleftheriadis discloses the recursive "rate control" scheme is done, and that a quantization rate controller is applied to control the buffer overflow and underflow conditions for controlling the buffer occupancy, wherein quantizer 1651 is used to adjust the quantization scale and that the quantization rate control scheme applies the use of a buffer to check the buffer occupancy and determines the proper quantization scale for controlling the target frame bit rate. Also, in column 8, lines 17-39, Eleftheriadis discloses the recursive buffer rate control scheme is utilized to ensure that the buffer does not overflow or underflow, where the quantization parameter can be recursively adjusted for adjusting the frame bit rate for each frame in a group of frames that including I, P and B frames. Thus, a connection connection between the bandwidth of the channel which is accepting data from the buffer and a target frame bit rate is disclosed and established.

Regarding lines 18-26 on page 13 of applicant's remarks about claims 22, 29 and 32, applicant states that Klein Gunnewiek does not meet the deficiencies of Eleftheriadis, in particular, the equation $V_i = K_i \times T_{frame}$. The examiner respectfully disagrees. Eleftheriadis does not specifically disclose the equation $V_i = K_i \times T_{frame}$. However, in Klein Gunnewiek's equations 4 and 5, there are values T_p and T_B and T_I that signify the target frame bit rates, and that K_p and K_B are constant values that are applied in a similar manner to applicant's K_i in the applicant equation $V_i = K_i \times T_{frame}$

where T_{frame} can be derived to be equal to $T_{frame} = V_i / K_i$. Thus, conceptually, Klein Gunnewiek teaches that the derivation of the target frame rates of I, P and B frames can be ascertained mathematically from the equations for different targeted frames and pictures. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal, as disclosed in Gunnewiek's column 2, lines 37-38.

Thus, the rejection of the claims is maintained.

Double Patenting

Claims 22-24, 27-30, 32-34, and 37-38 are rejected under judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Patent No. 6,023,296. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are broader in scope. Allowance of these claims would give the applicant an undue timewise extension of monopoly.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 22-30 and 32-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eleftheriadis (6,055,330) in view of Klein Gunnewiek (5,606,371).

Regarding claims 22, 32 and 43, Eleftheriadis discloses a method for allocating bits to encode each frame of an image sequence, each frame of said image sequence having at least one object, and a computer readable medium having stored thereon a plurality of instructions, the plurality of instructions including instructions which, when executed by a processor (col.15, ln.19-35), cause the processor to perform the steps comprising of:

determining a target frame bit rate for the frame in accordance with a quantizer scale (col.11, ln.53 to col.12, ln.32; Eleftheriadis discloses the frame bit rate R, and R_i is the target average bit rate for each object, and a_i is the amount of total frame rate R, which is allocated to the object, while R_n is the amount of the total frame rate R, which is allocated to the background, and that the quantizer scale or parameter is adjusted for affecting the target frame bit rate, where in fig.16, element 1651 is a quantizer);

allocating said target frame bit rate among the plurality of one object in accordance with a target object bit rate for the at least one object (col.11, ln.65 to col.12, ln.19; note equation 4 is used to determine the target frame bit rate, where part of the target frame bit rate is allocated as the target object bit rate, while the remainder is allocated as background target bit rate, the sum of the two being equal to the target frame bit rate R); and

recursively adjusting the target frame bit rate for each frame in the sequence (col.8, ln.17-39; note the recursive buffer rate control scheme is utilized to ensure that

the buffer does not overflow or underflow and the quantization parameter can be recursively adjusted for changing the frame bit rate for each frame, including I, P and B frames).

Eleftheriadis does not specifically disclose the equation $V_i = K_i \times T_{frame}$. However, Klein Gunnewiek teaches that the derivation of the target frame rates of I, P and B frames can be ascertained mathematically from the equations for different targeted frames and pictures (see equations 4 and 5 and note T_p and T_B and T_I are the target frame bit rates, and note that K_p and K_B are constant values that are applied in a similar manner to applicant's K_i in the applicant equation $V_i = K_i \times T_{frame}$ where T_{frame} can be derived to be equal to $T_{frame} = V_i / K_i$). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal (Gunnewiek col.2, ln.37-38).

Regarding claims 23, 30, 33 and 44-46, Eleftheriadis discloses the use of the sum of the absolute differences, between two VOPs to obtain shape information, and further control the rate at which object information is processed (the mean absolute difference must be manipulated from the summing of the absolute differences).

Regarding claims 24, 34 and 40, Eleftheriadis discloses the buffer fullness (col.11, ln.53-64, buffer fullness is checked and monitored for buffer overflow or underflow).

Regarding claims 25, 35 and 47, Eleftheriadis discloses the use of shape information for both field or frame compression, and object-based compression (col.3, ln.26-30, syntax information, motion information, and shape information must be disclosed in object based compression).

Regarding claims 26 and 36, Eleftheriadis discloses other rate control techniques which assigns different bit rates to objects based on shape or depth information (col.19, ln.23-35).

Regarding claims 27 and 37, Eleftheriadis discloses quantization being dependent on a specific object and its attributes such as bit rates, etc. (col.10, ln.34-45).

Regarding claims 28 and 38, Eleftheriadis discloses the quantization for encoding object information (col.15, ln.19-35).

Regarding claim 29, Eleftheriadis discloses an apparatus for encoding each frame of an image sequence, said frame comprising a plurality of objects, said apparatus comprising:

a motion compensator for generating a predicted image of a current frame (fig.16, element 1640);

a transform module for applying a transformation to a difference signal between the current frame and said predicted image, where said transformation produces a plurality of coefficients (fig.16, element 1650);

a quantizer for quantizing said plurality of coefficients with at least one quantizer scale for each object in the frame (fig.16, element 1651 is a quantizer; col.11, ln.53 to col.12, ln.32, Eleftheriadis discloses the frame bit rate R, and R_i is the target average bit

rate for each object, and a_i is the amount of total frame rate R, which is allocated to the object, while R_n is the amount of the total frame rate R, which is allocated to the background); and

a controller for selectively adjusting said at least one quantizer scale for a current frame in response to a target object bit rate for the at least one object, wherein said target object bit rate is derived from a target frame bit rate (fig.16, note "rate control" is done a rate controller to control the buffer overflow and underflow conditions for controlling the buffer occupancy).

Eleftheriadis does not specifically disclose the equation $V_i = K_i \times T_{frame}$. However, Klein Gunnewiek teaches that the derivation of the target frame rates of I, P and B frames can be ascertained mathematically from the equations for different targeted frames and pictures (see equations 4 and 5 and note T_p and T_B and T_I are the target frame bit rates, and note that K_p and K_B are constant values that are applied in a similar manner to applicant's K_i in the applicant equation $V_i = K_i \times T_{frame}$ where T_{frame} can be derived to be equal to $T_{frame} = V_i / K_i$). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Eleftheriadis and Gunnewiek as a whole to arrive at the conclusion of an object bit rate equation as denoted by applicant's $V_i = K_i \times T_{frame}$ by mathematical deduction and equation manipulation over time for accurately, efficiently encoding image data and mantaining high quality images at the display terminal (Gunnewiek col.2, ln.37-38).

Regarding claim 39, Eleftheriadis discloses the target frame bit rate is determined from a remaining number of bits for the image sequence, a number of

remaining frames in the image sequence, and/or a number of bits encoding a previous frame (col.11, ln.65 to col.12, ln.19; note equation 4 is used to determine the target frame bit rate, where part of the target frame bit rate is allocated as the target object bit rate, while the remainder is allocated as background target bit rate, the sum of the two being equal to the target frame bit rate R).

Regarding claim 41, Eleftheriadis discloses the polynomial regression is used for recursively adjusting the target frame bit rate (col.11, ln.63 to col.12, ln.10, note the equation is used in a recursive manner and when the equation is expanded, it is expressed as a polynomial regression).

Regarding claim 42, Eleftheriadis discloses the estimation of complexity, deriving the predicted number of bits to code the frame from the estimated complexity and calculating the quantizer scale in accordance with complexity (fig.16, note the activity or complexity is estimated in motion estimation 1640, and that there the predicted values estimated based on the input information versus the predicted information to establish a proper coding bit rate, and then, the quantizer 1651 is then applied for properly adjusting the quantizer value in accordance with the complexity, based on the recursive coding process illustrated in fig.16).

Regarding claims 48 and 49, Eleftheriadis discloses the changing of bit numbers for shape coding (fig.16, note the number of bits can incrementally or decrementally adjusted for shape coding; and in col.3, ln.26-30, syntax information, motion information, and shape information must be disclosed in object based compression).

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (571) 272-7341. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James J. Groody can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Allen Wong
Primary Examiner
Art Unit 2621

AW
1/17/07